

# MATERIAL SAFETY DATA SHEET

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## 1. SUBSTANCE AND SOURCE IDENTIFICATION

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National Institute of Standards and Technology  
Standard Reference Materials Program  
100 Bureau Drive, Stop 2320  
Gaithersburg, Maryland 20899-2320

SRM Number: 915b  
MSDS Number: 915b  
SRM Name: Calcium Carbonate,  
Clinical Standard  
Date of Issue: 07 April 2006

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**Description:** This Standard Reference Material (SRM) is intended for use as an analytical standard of known purity. It is intended primarily for use in the calibration and standardization of procedures for calcium determinations employed in clinical analysis and for routine critical evaluation of the daily working standards used in these procedures. The SRM consists of a 20 g unit.

**Substance:** Calcium Carbonate

**Other Designations:** Calcium salt; carbonic acid calcium salt; calcite; marble; aragonite; agricultural limestone; chalk; dolomite; Franklin limestone; lithographic stone; Tums®.

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## 2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

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<b>Component:</b>	Calcium Carbonate
<b>CAS Number:</b>	471-34-1
<b>EC Number (EINECS):</b>	207-439-9
<b>Nominal Mass Fraction (%):</b>	100
<b>EC Classification:</b>	Xi (irritant)
<b>EC Risk:</b>	R36/38 (irritating to eyes, respiratory system and skin)
<b>EC Safety:</b>	S2 (keep out of reach of children) S24/25 (avoid contact with skin and eyes) S26 (in case of contact with eyes, rinse immediately with plenty of water and seek immediate medical advice)

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## 3. HAZARDS IDENTIFICATION

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**NFPA Ratings (Scale 0-4):** Health = 0      Fire = 0      Reactivity = 0

**Major Health Hazards:** May irritate skin, eyes, and respiratory tract. Chronic ingestion may cause hypercalcemia (excess calcium in the blood) and alkalosis (abnormally alkaline blood). Classified as a nuisance particle.

**Physical Hazards:** None reported.

### Potential Health Effects

**Inhalation:** May irritate respiratory tract; symptoms include coughing, nasal irritation, sneezing, and sore throat. Chronic exposure to dust may cause lung damage.

**Skin Contact:** Mildly irritating to skin.

**Eye Contact:** May cause mechanical irritation, redness, watering, and pain.

**Ingestion:** This material is widely used in calcium supplements and antacid tablets. Acute illness is unlikely, but chronic ingestion of large amounts of calcium carbonate can impair functioning of the kidneys and central nervous system. Symptoms may include irritability, lethargy, stupor, and coma.

**Medical Conditions Aggravated by Exposure:** (1) By ingestion: hypoparathyroidism and other disorders of calcium metabolism; sarcoidosis; kidney stones or other kidney disorders; milk-alkali syndrome and other conditions associated with hypercalcemia or alkalosis; hypophosphatemia. People who take digitalis for a heart condition should also avoid ingesting large amounts of calcium. (2) By inhalation: Chronic inhalation exposure to this material can aggravate pre-existing COPD or other disorders of the respiratory tract.

**Listed as a Carcinogen/ Potential Carcinogen:**

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens	<u>      </u>	<u>  X  </u>
In the International Agency for Research on Cancer (IARC) Monographs	<u>      </u>	<u>  X  </u>
By the Occupational Safety and Health Administration (OSHA)	<u>      </u>	<u>  X  </u>

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## 4. FIRST AID MEASURES

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**Inhalation:** Move the person to fresh air immediately. Get medical aid if irritation persists or if breathing difficulty develops. Qualified medical personnel may give oxygen if necessary.

**Skin Contact:** Remove contaminated clothing. Wash affected skin with soap and water. If irritation persists, get medical aid and bring the container or label. Wash contaminated clothing before reusing.

**Eye Contact:** Remove contact lenses (if any). Flush eyes with running water for at least 15 minutes, keeping eyelids open and raising lids to remove all chemical. If irritation persists, get medical aid at once, and bring the container or label.

**Ingestion:** If a large dose was ingested and symptoms appear (see Section 3), contact a poison control center for instructions. Do not induce vomiting unless told to do so. Get medical aid as soon as possible, and bring the container or label.

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## 5. FIRE FIGHTING MEASURES

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**Fire and Explosion Hazards:** Calcium carbonate by itself is nonflammable and noncombustible, but it ignites on contact with fluorine.

**Extinguishing Media:** Use extinguishing media appropriate to the surrounding fire: water spray, dry chemical, carbon dioxide, or foam.

**Fire Fighting:** Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

**Flash Point (°C):** N/A

**Autoignition (°C):** N/A

**Flammability Limits in Air:** N/A

**Lower Explosive Limit (LEL):** N/A

**Upper Explosive Limit (UEL):** N/A

**Flammability Class (OSHA):** N/A

**Products of Combustion:** Thermal decomposition can produce calcium oxide fumes and carbon dioxide.

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## 6. ACCIDENTAL RELEASE MEASURES

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**Occupational Release:** Isolate the spill area. Cleanup personnel must wear personal protective equipment (Section 8). Vacuum or sweep up spilled material and place in a suitable container for reclamation or disposal, using a method that does not generate dust (such as wet sweeping). Provide ventilation.

**Disposal:** Refer to Section 13, Disposal Considerations.

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## 7. HANDLING AND STORAGE

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**Storage:** Store in tightly closed original container in a cool, dry, well-ventilated area. Isolate from acids and other incompatible materials (Section 10). Observe all warnings and precautions when handling empty containers, which may retain hazardous product residues.

**Safe Handling Precautions:** If contact is unavoidable, wear appropriate protective clothing (Section 8). Wash contaminated clothing before re-use.

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## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

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**Exposure Limits:** No TLV has been established for this material. Limits for total dust, nuisance dust, or particulates not otherwise classified:

ACGIH TLV-TWA: 10 mg/m<sup>3</sup> (inhalable particles); 3 mg/m<sup>3</sup> (respirable particles)  
OSHA TWA-PEL: 15 mg/m<sup>3</sup> (total dust); 5 mg/m<sup>3</sup> (respirable dust)

**Ventilation:** Use local or general exhaust to keep employee exposures below limits. Local exhaust ventilation is preferred because it can control contaminant emissions at the source, preventing dispersion into the general work area. Refer to the ACGIH document *Industrial Ventilation, a Manual of Recommended Practices*.

**Respirator:** If necessary, refer to the "NIOSH Guide to the Selection and Use of Particulate Respirators Certified under 42 CFR 84" for selection and use of respirators certified by NIOSH.

**Eye Protection:** Use chemical safety goggles where dusting or splashing of solutions may occur. See OSHA standard (29 CFR 1910.133) or European Standard EN166. The employer should provide an emergency eye wash fountain and safety shower in the immediate work area.

**Personal Protection:** Wear appropriate gloves and protective clothing to minimize contact with skin.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

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**Component:** Calcium Carbonate

**Appearance and Odor:** White powder or colorless crystals, odorless

**Relative Molecular Weight:** 100.09

**Molecular Formula:** CaCO<sub>3</sub>

**Density (g/cm<sup>3</sup>):** 2.7 to 2.95

**Solvent Solubility:** Soluble in dilute acids

**Water Solubility:** 0.001g in 100 mL water

**Boiling Point (°C):** N/A

**Melting Point (°C):** Aragonite, 825 (1517°F)

**pH:** Saturated solution @ 20°C (68°F) = 12.64

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## 10. STABILITY AND REACTIVITY

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**Stability:**    ☒ Stable                      ☐ Unstable

Stable at normal temperatures and pressure.

**Conditions to Avoid:** Dust generation, heat, contact with incompatible materials.

**Incompatible Materials:** Acids, alum (potassium aluminum sulfate), fluorine, magnesium + hydrogen, ammonium salts.

**Fire/Explosion Information:** See Section 5.

**Hazardous Decomposition:** Thermal decomposition can produce calcium oxide fumes and carbon dioxide.

**Hazardous Polymerization:**    ☐ Will Occur    ☒ Will Not Occur

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## 11. TOXICOLOGICAL INFORMATION

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**Route of Entry:**    ☒ Inhalation                      ☒ Skin                      ☒ Ingestion

**Toxicity Data:**

Rabbit, skin irritation (24 hrs): 500 mg

Rabbit, eye irritation (24 hrs): 750 µg

Rat, oral: LD<sub>50</sub> = 6450 mg/kg

**Target Organ(s):** Central nervous system, blood, kidneys, eyes, skin, upper respiratory tract.

**Mutagen/Teratogen:** This material is not known to cause mutations or birth defects.

**Health Effects:** See Section 3.

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## 12. ECOLOGICAL INFORMATION

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**Ecotoxicity Data:**

Western mosquitofish (*Gambusia affinis*), LC<sub>50</sub> (24–96 hrs): 56,000,000 µg/L

Mollies (*Poecilia* sp.), mortality (96 hrs): 200,000 µg/L

Phytoplankton: primary productivity, abundance, and biomass were reduced at concentrations > 5,000 µg/L

Opossum shrimp (*Americamysis bahia*), growth and reproduction: reduced at concentrations > 28,000 µg/L

**Environmental Fate:** Calcium carbonate is a poorly soluble complex that exists mainly in the precipitated form. The rest dissolves in water to form carbonate and a cation. Dissolved carbonate, in turn, forms complexes with sodium, magnesium, and other metals. Carbonate concentration is used as an indicator of alkalinity and hardness in natural waters. In soil, most calcium exists as adsorbed cations on the colloidal surface.

**Environmental Summary:** The toxicity of calcium carbonate is low, and it does not bioaccumulate. Some aquatic organisms may be sensitive to changes in pH and turbidity.

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## 13. DISPOSAL CONSIDERATIONS

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**Waste Disposal:** Dispose of container and unused contents in accordance with federal, state, and local requirements, which vary according to location. Decontaminate containers before recycling. Processing, use, or contamination of this product may change the waste management options.

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## **14. TRANSPORTATION INFORMATION**

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**U.S. DOT and IATA:** Not regulated.

**Canadian Transportation (TDG):** Not regulated.

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## **15. REGULATORY INFORMATION**

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### **U.S. REGULATIONS**

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.

SARA Title III Section 302: Not regulated.

SARA Title III Section 304: Not regulated.

SARA Title III Section 313: Not regulated.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE: Yes

CHRONIC: No

FIRE: No

REACTIVE: No

SUDDEN RELEASE: No

### **STATE REGULATIONS**

California Proposition 65: Not regulated

### **CANADIAN REGULATIONS**

WHMIS Classification: Not regulated; D2B, materials causing other toxic effects.

### **EUROPEAN REGULATIONS**

EU/EC Classification: Xi (irritant)

### **NATIONAL INVENTORY STATUS**

U.S. Inventory (TSCA): Yes

TSCA 12(b), Export Notification: No

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## 16. OTHER INFORMATION

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### Sources:

Bohadana AB, et al., Airflow obstruction in chalkpowder and sugar workers. *International Archives of Occupational and Environmental Health* 1996;68(4):243-8.

Crummy F, et al., A possible case of pneumoconiosis in a limestone quarry worker. *Occupational Medicine* (London) 2004 Oct;54(7):497-9.

IUCLID Dataset: Calcium Carbonate. European Chemicals Bureau, 18 February 2000.

PAN Pesticide Database: Toxicity Studies for Calcium Carbonate on All Organism Groups.

U.S. National Institute for Occupational Safety and Health, *NIOSH Pocket Guide to Chemical Hazards*, June 1990 edition. DHHS (NIOSH) Publication No. 90-117.

U.S. National Institute of Standards and Technology, *Certificate of Analysis: Standard Reference Material® 2193a, Calcium Carbonate pH Standard [used as saturated Ca(OH)<sub>2</sub> solution]*. 19 June 2003.

**Disclaimer:** Physical and chemical data contained in this MSDS are provided only for use as a guide in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.